

THE WEATHER OF THE MONTH.

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The statistical aspects of the weather of the month are presented in the tables which form the closing part of this REVIEW. Table I, in particular, contains numerous details that are important in the study of climatology. The numerical values in the tables have been generalized in a number of cases, the results appearing on Charts Nos. III to VII, inclusive.

PRESSURE AND WIND.

Normal conditions.—The geographic distribution of normal barometric readings at sea level and under local gravity for August is shown by Chart V of the MONTHLY WEATHER REVIEW for August, 1893.

Normal pressure for August is highest, 30.00 inches and over, from the Ohio Valley southeastward to the Gulf and Atlantic coasts, reaching a maximum of about 30.05 on the South Carolina coast. It is also high, about 30.05, on the coast of Washington and Oregon. Normal pressure is lowest over the Rocky Mountain and Plateau regions with a minimum of 29.80 inches at Yuma, Ariz. As compared with July, there is generally an increase in pressure in all districts, except on the Pacific coast and south of latitude 35°. The greatest decrease, .05 inch, occurs over the Florida Peninsula; the greatest increase, .05 inch, over New England.

The prevailing winds of August differ but slightly from those of July. On the south Atlantic and west Gulf coasts, in the Mississippi Valley, and generally throughout the Plains region, the prevailing winds are southeasterly, as would be expected from a consideration of the pressure gradients. There are, however, a number of cases where the direction of the wind is determined by local conditions and topography rather than pressure gradients. On the Pacific coast the prevailing winds are westerly and northwesterly, as would be expected. The winds of the Rocky Mountain and Plateau regions are variable; the prevailing winds of the Lake region and New England are southwesterly.

The current month.—The distribution of monthly mean pressure, as shown by Chart IV, is in general accord with normal conditions. Pressure was above normal at Halifax and Sydney and south of a line drawn from southern New Jersey to the mouth of the Mississippi River, the area of maximum departures, +.08 inch, being on the coast from Hatteras to Charleston. Pressure was also above normal at a few isolated stations in the Rocky Mountain region; elsewhere it was below normal by amounts varying from .01 inch on the New England coast to .11 inch at Roseburg Oreg. The departures exceeded .05 inch generally over the northern Plateau, north Pacific coast and interior California. As compared with July, pressure fell decidedly over almost the entire country. There was a slight rise over the Carolinas, New Mexico, and portions of the adjoining States of Texas and Arizona, and also over Saskatchewan, Alberta, and Assiniboia.

The direction of the surface winds was in almost all cases in close accord with normal conditions.

TEMPERATURE OF THE AIR.

Normal conditions.—The normal temperature of the air in the United States in August varies from about 84° at Key West, 81° at Jacksonville, 81° at New Orleans, 83° at Galveston, 69° at San Diego, to 61° at Eastport, 69° at Burlington, 68° at Buffalo, 70° at Detroit, 65° at Duluth, 63° at St. Vincent, 66° at Havre, 69° at Spokane, and 63° at Seattle, on Puget Sound. The warmest regions are the lower Rio Grande Valley and southwestern Arizona, including a portion

of the desert region of California; the coolest portion of the country is the region about Lake Superior. The seacoast is cooler than the interior on corresponding parallels.

In studying the distribution of monthly mean temperatures it will be found very helpful to consult the charts at the end of this REVIEW, especially No. VI, Surface Temperatures, Maximum, Minimum, and Mean. This chart gives a very good idea of the variations of temperature with latitude and longitude, and also of the distribution of normal surface temperatures. Chart VI for any month will differ from a normal chart merely in the displacement or bending of the isotherms northward or southward according as the temperature of the particular locality is above or below the normal for the place and season.

The current month.—The month opened with temperature below normal from the Mississippi Valley westward to the middle Plateau, except over a narrow fringe of country on the northern border. Temperature was much above normal on the Atlantic seaboard westward to the Ohio Valley and also on the northern Pacific coast and northern Plateau. By the second week of the month the high temperatures on the northern Plateau had spread southward and eastward to the eastern foothills of the Rocky Mountains. Temperature was still below normal in the Mississippi Valley and low temperatures prevailed over a portion of the Middle and south Atlantic States. Temperature was above normal during the third week over practically all of the country except a portion of the north Pacific coast and the northern Plateau. During the fourth week similar conditions obtained, the average daily excess being greatest (from 6° to 11°) in the lower Missouri Valley.

The month as a whole was warmer than usual, although in a few districts there was a slight deficit in the average daily temperature.

The maximum temperature for the month at regular Weather Bureau stations was 113°; that temperature being registered at three different stations on as many different dates, viz, Walla Walla, Wash., on the 10th; Fresno, Cal., on the 11th; and Yuma, Ariz., on the 18th. There were no unusually high temperatures east of the Rocky Mountains, although much suffering was caused by the humid condition of the atmosphere. Prostrations and deaths from heat occurred in the Mississippi and Missouri valleys, the Lake region and the Middle Atlantic States, August 22, 23, 24, and 25. There were a few deaths and prostrations in New York and Pennsylvania, and, possibly, in other eastern States on August 4 and again on August 9. In the Lake region prostrations were reported on the 31st; there were also a few cases of prostration and death, due to excessive heat, in California. The latter part of the month was especially trying east of the Mississippi River on account of the humid state of the atmosphere. It is to be noted, however, that there were not many fatal cases of sunstroke, notwithstanding the high relative humidity. The maximum temperature did not reach 100° east of the Mississippi except in the lower Mississippi Valley. Maximum temperatures ranging from 100° to 108° occurred in Central Kansas and the Missouri Valley from Omaha to eastern Montana. Maximum temperatures of over 100° were also recorded in the head waters of the Platte River Valley, and in Southern Central Wyoming.

A rather unusual case of local heating over an elliptical-shaped area occurred in central Kansas, where the monthly mean temperature was from 2° to 6° higher than at surrounding stations on all sides. The monthly mean temperature in

the Missouri Valley and eastern Kansas, under normal conditions, should be higher than in central Kansas, yet it was fully 3° lower than over the area above mentioned.

Temperatures of 32° were registered at a few stations in the Rocky Mountain region.

The distribution of the observed monthly mean temperature of the air is shown by red lines (isotherms) on Chart VI. This chart also shows the maximum and the minimum temperatures, the former by black and the latter by dotted lines. As will be noticed, these lines have been drawn over the Rocky Mountain Plateau region, although the temperatures have not been reduced to sea level; the isotherms relate, therefore, to the average surface of the country in the neighborhood of the various observers, and as such must differ greatly from the sea-level isotherms of Chart IV.

The average temperatures of the respective geographic districts, the departures from the normal of the current month and from the general mean since the first of the year, are presented in the table below for convenience of reference:

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	10	69.7	+ 2.5	+ 9.8	+ 1.2
Middle Atlantic	12	75.7	+ 2.4	+ 12.7	+ 1.6
South Atlantic	10	79.6	+ 1.1	+ 7.2	+ 0.9
Florida Peninsula	7	81.1	0.0	+ 2.6	+ 0.3
East Gulf	7	79.8	- 0.3	+ 4.0	+ 0.5
West Gulf	7	81.9	+ 1.3	+ 11.5	+ 1.6
Ohio Valley and Tennessee	12	76.8	+ 2.0	+ 14.7	+ 2.7
Lower Lake	8	71.8	+ 2.4	+ 21.9	+ 2.7
Upper Lake	9	66.6	+ 0.8	+ 21.5	+ 2.7
North Dakota	7	65.5	+ 0.4	+ 22.8	+ 2.8
Upper Mississippi	11	73.6	+ 0.8	+ 18.1	+ 2.3
Missouri Valley	10	75.1	+ 1.9	+ 21.0	+ 2.6
Northern Slope	7	70.4	+ 2.6	+ 10.1	+ 1.3
Middle Slope	6	76.6	+ 1.9	+ 10.7	+ 1.3
Southern Slope	5	77.7	- 0.6	+ 5.9	+ 0.7
Southern Plateau	13	78.8	+ 0.6	- 0.1	0.0
Middle Plateau	9	72.4	+ 2.0	- 4.0	- 0.5
Northern Plateau	11	72.8	+ 2.8	+ 8.0	+ 1.0
North Pacific	9	63.3	+ 1.9	+ 7.6	+ 1.0
Middle Pacific	5	64.4	- 0.4	- 5.0	- 0.6
South Pacific	4	72.9	+ 1.5	+ 2.4	+ 0.3

In Canada.—Professor Stupart says:

The mean temperature was above average over the larger portion of the Dominion, Keewatin, Manitoba and Assiniboia alone showing average or a little below. The largest excess occurred in the upper mainland of British Columbia, where it was at many points as much as 6° and 8°. The Province of Ontario, northward from Lakes Erie and Ontario, showed the next largest excess, amounting to between 3° and 5°, and eastward from this, in Quebec and the Maritime Provinces, the departure above average ranged between 3° and the average.

PRECIPITATION.

Normal conditions.—The regions of heavy precipitation (4 to 6 inches and over) in August are on the south Atlantic and eastern Gulf coasts, including the Peninsula of Florida, whence the fall decreases irregularly to the Dakotas and Montana, where it is about an inch. The rainfall of Arizona and New Mexico is comparatively heavy during the months of July and August. The rainfall of California is almost nil, except on the coast region of the northern part of the State, whence it increases to a maximum of about 2 inches on the coast of Washington.

Current month.—The month was one of generous rainfall over almost the entire country, the fall east of the Mississippi being larger than for many years. Torrential rains fell in a number of places on the south Atlantic and Gulf coasts, the greatest monthly fall (31 inches) being in western Florida. There was also very heavy rain in the region about Savannah and in various localities throughout Florida where the total

monthly fall exceeded 20 inches. On the eastern slope of the Appalachians, in Georgia and Florida, the fall was also quite heavy, being over 10 inches at a number of places. Local falls of 10 inches or more for the month also occurred in West Virginia, western Maryland, northern Virginia, and eastern Pennsylvania, and quite generally throughout Georgia, Alabama, and Florida. The greatest downpour in twenty-four hours or less occurred at Marion, Ala., 9.90 inches of water falling on the 10th from 8 a. m. to 6 p. m. The station at Marion is not equipped with a self-registering gauge, hence no information relative to the varying intensity of the storm can be had. Falls of 10 inches in twenty-four hours are liable to occur on the Gulf and South Atlantic coasts, in the Mississippi Valley, and at less frequent intervals in the Ohio Valley and the Middle Atlantic States.

During the current month daily falls varying from 4 to 8 inches occurred mainly throughout Florida and Georgia, although such falls were not by any means wholly confined to those States.

HEAVY LOCAL RAINSTORMS.

A very interesting and instructive illustration of the purely local character of heavy rains is found in the storm of the 12th in the District of Columbia. Heavy rain began about the middle of the forenoon and continued with varying intensity until about 6 p. m., 4.92 inches of rain having fallen. The storm was purely local, however, as may be seen from the table below, in which the catch of a number of gauges in the District and vicinity for the twenty-four hours is given. The distance of the various gauges in miles from the capitol building is also given.

Heavy rains in the vicinity of Washington, D. C., August 12, 1898.

Gauges.	Amount.	Distance and direction from Capitol.
	Inches.	
Great Falls, Md.	0.93	16 miles northwest.
Kensington, Md.	1.87	9 miles north-northwest.
Laurel, Md.	1.40	18 miles northeast.
Manassas, Va.	0.90	30 miles southwest.
Receiving Reservoir, D. C.	5.44	6½ miles northwest.
Takoma Park, D. C.	5.34	5½ miles north.
College Park, Md.	2.76	7½ miles northeast.
Alexandria, Va.	2.16	6 miles south.
Distributing Reservoir, D. C.	5.93	4 miles northwest.
30th and M streets, Washington, D. C.	4.85	2½ miles northwest.
Weather Bureau, Washington, D. C. *	4.96	2 miles northwest.

* 1.30 inch fell in 1 hour and 5 minutes.

Torrential rains on August 24 in northern central New York caused a number of serious washouts, particularly on railroads centering at Utica and Herkimer. Heavy rains on the head waters and along the valleys of the smaller streams also caused destructive floods at a number of points in the State. The village of Deerfield Corners was inundated by a wave of water four or five feet in depth, which filled the houses with mud and water, swept away bridges and gardens, and left a deposit of several inches of silt and mud over the village. The damage in the village was estimated at \$10,000.

The rainstorm of the 3d in Philadelphia, Pa., an account of which is reprinted from the report of the Pennsylvania Climate and Crop Section, T. F. Townsend, Director, merits the careful attention of municipal engineers and others having to do with the construction of drainage systems.

On August 3, between 10:50 a. m. and 12:35 p. m., the most terrific electrical and rain storm on record passed over the central portion of Philadelphia. Other than the dense black cloud which accompanied it, its approach was without special warning, as there were only slight changes in pressure, temperature, or wind velocity—the latter continued light during the storm.

The day began warm and sultry, with a thin, low-lying cloud over-spreading the sky. At sunrise the heavens were luminous with a peculiar yellow light which gave a weird appearance to terrestrial objects.

Light showers, amounting to 0.15 inch, occurred between 5:35 and 7 a. m. As the day advanced the sky brightened, and there was faint

sunshine for a little over an hour. Shortly after 10 a. m. the clouds began to thicken and darken, and soon necessitated the use of artificial light in buildings. At 10:50 a. m. both the electrical and rain storm burst with sudden fury and continued with but little variation in its intensity until 12:35 p. m. During this time the electrical forces of nature seemed centered over the city. Vivid and blinding flashes of lightning occurred in rapid succession, and these were followed by terrific crashes of thunder.

A number of buildings, towers, flagstaves, etc., were struck by lightning, but probably owing to the heavy downpour of rain, no serious fires occurred, with the single exception of the destruction of the oil tanks at Point Breeze. One person, Mr. William Noble, was killed by lightning.

The following records of rainfall are from self-recording instruments:

Weather Bureau Station, Ninth and Chestnut streets.

Maximum rainfall for 5 min., 0.60 = 7.20 per hour.

Maximum rainfall for 10 min., 0.94 = 5.64 per hour.

Maximum rainfall for 1 hour, 3.81 = 3.81 per hour.

Total rainfall during storm, from 10:50 a. m. to 12:35 p. m., 5.43 inches.

The total rainfall was practically the same at the Pennsylvania Hospital and at the station of the voluntary observer in Camden, N. J. While the above 5 and 10-minute rainfalls have been exceeded at several stations of the Weather Bureau, according to the official records the one-hour rainfall of 3.81 inches is 1.26 inches more than the greatest maximum previously recorded by self-recording gauges at any station.

Department of Surveys, Fifth and Wharton streets.

Maximum rainfall for 15 min., 1.00 = 4.00 per hour.

Maximum rainfall for 1 hour, 2.50 = 2.50 per hour.

Total rainfall, 3 hours, 30 minutes, = 5.17 inches.

Department of Surveys, Frankford avenue and Orthodox street.

Maximum rainfall for 12 min., 0.50 = 2.50 per hour.

Maximum rainfall for 1 hour, 1.20 = 1.20 per hour.

Total rainfall, 3 hours, 1.75 inches.

The accumulation of water was so rapid in the lower districts as to produce a heavy hydraulic pressure in the city sewers, notwithstanding the relief afforded by open catch basins and manholes. As a result many buildings were flooded with water which flowed into them from the sewers through the drains and waste pipes, and was discharged from closets, basins, and sinks. The overflow from this source in some cases rose to the second floors.

The general movement of the storm, from west to east, was apparently interrupted after its center had passed a short distance north of the station, as it then circled toward the southeast and returned directly over the station before resuming its easterly course. This movement was accomplished with only a slight break in the intensity of the electrical display and heavy downpour of rain.

Peter Schall, No. 1618 Chadwick street, was drowned in a bakeshop cellar while trying to save property stored there.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		<i>Inches.</i>		<i>Inches.</i>	<i>Inches.</i>
New England	10	4.78	120	+0.80	+ 3.40
Middle Atlantic	12	6.01	130	+1.40	+ 1.30
South Atlantic	10	8.81	129	+2.00	+ 6.10
Florida Peninsula	7	10.23	167	+4.10	+ 6.80
East Gulf	7	9.71	164	+3.80	+ 8.80
West Gulf	7	8.05	84	-0.60	+ 3.60
Ohio Valley and Tennessee	12	4.01	111	+0.40	+ 0.30
Lower Lake	8	8.23	107	+0.20	+ 0.80
Upper Lake	9	3.38	117	+0.50	+ 0.70
North Dakota	7	1.72	81	-0.40	+ 1.50
Upper Mississippi	11	3.36	110	+0.30	+ 3.60
Missouri Valley	10	2.64	81	-0.60	+ 2.70
Northern Slope	7	0.65	46	-0.70	+ 0.60
Middle Slope	6	1.73	66	-0.90	+ 2.30
Southern Slope	6	3.08	111	+0.30	+ 0.90
Southern Plateau	13	1.85	106	-0.10	+ 0.10
Middle Plateau	9	0.60	120	-0.10	+ 1.10
Northern Plateau	11	0.49	136	-0.10	+ 2.40
North Pacific	9	0.37	38	-0.60	+ 5.80
Middle Pacific	5	0.01	100	0.00	+ 8.20
South Pacific	4	T.	100	0.00	+ 5.10

The geographic distribution of precipitation is shown on Chart III, and the numerical values for about 3,000 stations appear in Tables II and III, while the details as to excessive rains will be found in Table XI.

In Canada.—Prof. R. F. Stupart says:

The entire Province of British Columbia and a large portion of Ontario suffered from a deficiency of rain. In the former Province there were a few scattered showers, but at many points there was absolutely no rainfall, and in the latter Province it was more especially along the shores of Lake Ontario and northward from the west end of that lake to the Georgian Bay that the deficiency was very marked, while in the more eastern and northern counties the rainfall was well up to or even exceeded the average. Over most of Quebec there was a small deficiency, as there also was in southwestern New Brunswick, but generally in the Maritime Provinces the rainfall was above the average, and to a large extent above in southern and western Nova Scotia. Some exceptionally heavy thunderstorms occurred in Ontario and New Brunswick. During the one on the 21st, in the counties of York and Ontario, five and a quarter inches of rain fell at Pickering.

HAILSTORMS.

The following account of severe hailstorms has been compiled from press dispatches, reports of Climate and Crop section directors, and the statements of regular and voluntary observers:

2.—A hailstorm, in which the size of the stones varied from that of an egg to a large-sized apple, swept over Springer, N. Mex., on the night of the 2d. The force of the hailstones was so great that, in many cases, tin roofs were completely riddled.

14th.—A hailstorm, about 3 miles wide, struck the towns of Fairfax, Kertzonville, Russia, Hammond, Fanny, and Reis, Minnesota, at 6 p. m. The damage done by the storm was variously estimated at from one-third to three-quarters loss of the crops in the field. Very little insurance was carried in these towns.

A heavy hailstorm, about 2 miles wide, also crossed the northeastern portion of Brule County, S. D., doing considerable damage to windows, gardens, etc.

In Chamberlain Mr. Fred. C. Warnshuis, voluntary observer, picked up a hailstone measuring 8 inches in circumference. He states the hailstones were very hard and that some of them contained dust particles and small pieces of gravel.

A heavy hailstorm passed over a part of Noble County, Ohio, causing great damage to the tobacco crop. The losses were small in individual cases but the aggregate was a considerable sum.

Reports from Carrington, N. Dak., state that a hailstorm destroyed many thousand acres of grain in Foster and Eddy counties on the early morning of the 14th. Some of the fields were scarcely touched while a majority were injured from 20 to 50 per cent. A rough estimate places the damage at a loss of 20,000 acres.

16th.—Delaware, Ohio, was visited by a heavy hailstorm on the evening of the 16th. The fall of hail caused a general stampede of teams that were on the street, and many windows were broken.

17th.—A series of severe thunderstorms, and in some cases, accompanied by large hail (as large as walnuts), passed over eastern Massachusetts on the evening of the 17th. Hailstones 1½ inch in diameter were picked up in Boston. In the latter city the hail lasted but 5 minutes, being followed immediately by a heavy downpour of rain.

19th.—Gothenburg, Nebr., was visited by a severe wind and hail storm at 9 p. m. of the 19th. Nearly all of the windows on the north and east sides of the buildings were destroyed. In the country east of the town the damage was much greater, particularly over a strip of country from 3 to 5 miles wide in which hundreds of acres of corn were cut off close to the ground, wheat in the stack and shock was badly damaged and, in some cases, barns and buildings were completely demolished, owing to the severity of the wind.

There was also a severe hailstorm in Iowa, between Spencer and Emmetsburg, on the same date. The corn crop within an area about 10 miles wide and 15 to 20 miles long was almost totally destroyed.

24-25th.—Hailstorms of unusual severity occurred in various parts of central New York.

The following are the dates on which hail fell in the respective States:

Arizona, 3, 16, 19. Arkansas, 23, 24. California, 6. Colorado, 1, 2, 5, 6, 7, 8, 14, 17, 18, 23. Connecticut, 17. Idaho, 16. Illinois, 14, 15, 16, 26. Indiana, 15, 26. Iowa, 14, 16, 19. Kansas, 1. Maine, 17. Massachusetts, 17. Michigan, 3, 15, 16, 28. Minnesota, 14, 15. Mississippi, 18. Missouri, 15, 17, 27. Montana, 20, 21, 31. Nebraska, 12, 13, 15, 16, 17, 23, 25. Nevada, 5, 7, 15, 26. New Hampshire, 16, 24. New Jersey, 4, 17. New Mexico, 1, 6, 9, 23. New York, 1, 5, 12, 16, 22, 23, 24. North Carolina, 1, 4, 5. North Dakota, 14, 21, 22. Ohio, 2, 3, 8, 16, 17, 19, 24, 29, 30. Oklahoma, 17. Oregon, 29. Pennsylvania, 3, 16, 24. South Dakota, 14. Texas, 2. Utah, 3, 4, 15, 29, 30. Virginia, 7, 9. Wisconsin, 14, 15, 16, 22, 23. Wyoming, 4, 6.

Hail was reported on the greatest number of dates in Colorado, 10; Ohio, 9; and New York and Nebraska, 7 each. There appears to have been less hail than during the preceding month.

HUMIDITY.

The humidity observations of the Weather Bureau are divided into two series; the first or tridaily series began in 1871 and ended with 1887; the second or twice-daily series is continuous from 1888 to the present time.

The monthly means of the second or present series are based upon observations of the whirled psychrometer at 8 a. m. and 8 p. m., seventy-fifth meridian time, which corresponds to 5 a. m. and 5 p. m., Pacific; 6 a. m. and 6 p. m., Mountain; and 7 a. m. and 7 p. m., Central standard time.

Mean values computed from the first series are naturally not directly comparable with those of the second. In general the means of the first series are lower than those of the second, since they include an observation in the afternoon when the relative humidity of the air is near the minimum of the day. At stations in the western plateau region, however, the converse holds good, the means of the second series being lower than those of the first by amounts ranging from 0 to 10 per cent on the average of the year.

In the present state of knowledge respecting the diurnal variation in the moisture of the air, we are scarcely warranted in combining the two series in a general mean.

The current month.—Relative humidity was above the normal in all districts east of the Mississippi River; also in North Dakota, the northern Plateau and the southern Pacific coast. It was exactly normal in the Florida Peninsula and below normal in the remaining districts. The atmosphere was unusually humid in the Middle Atlantic States, the upper Mississippi Valley, the Ohio Valley and Tennessee. The departure from the normal, as will be seen by the table below, was more pronounced than has been the case in any month since the first of the year. While there have been but few fatalities from heat the bodily discomfort experienced in the large cities on the eastern seaboard during the month was very great.

In using the table by means of which the amount of moisture in the air is computed from the readings of the wet and dry bulb thermometers, the pressure argument has almost always been neglected, an omission that has little significance except for low temperatures and at high stations, such as Santa Fe, El Paso, Cheyenne, and a few others. The failure to apply a correction for the influence of the prevailing pressure on the psychrometer has the effect of making the monthly means of relative humidity at high-level stations too small by quantities ranging from 5 to 10 per cent. In the application of the monthly averages of the above table, or those of individual stations in Table I, to special inquiries, whether in the

departments of biology, climatology, or sanitary science, this fact should be kept in mind. It should also be remembered that the hours at which observations in the Rocky Mountain Plateau region are made, viz, at 5 or 6 local mean time, morning and afternoon, give approximately the maximum and minimum values of the relative humidity for the day; probably the means of such hours approach more nearly the true mean of the month than is the case on the Atlantic seaboard and in the seventy-fifth meridian time belt.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	85	+ 3	Missouri Valley	67	0
Middle Atlantic	80	+ 5	Northern Slope	48	- 3
South Atlantic	86	+ 4	Middle Slope	66	- 1
Florida Peninsula	81	0	Southern Slope	53	- 5
East Gulf	85	+ 5	Southern Plateau	43	- 5
West Gulf	78	+ 4	Middle Plateau	31	- 1
Ohio Valley and Tennessee	77	+ 6	Northern Plateau	44	+ 1
Lower Lake	75	+ 5	North Pacific Coast	77	- 1
Upper Lake	79	+ 5	Middle Pacific Coast	65	- 3
North Dakota	84	+ 1	South Pacific Coast	64	+ 1
Upper Mississippi Valley	76	+ 6			

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 21 regular stations of the Weather Bureau by its photographic and at 47 by its thermal effects. The photographic record sheets show the apparent solar time, but the thermometric records show seventy-fifth meridian time; for convenience the results are all given in Table IX for each hour of local mean time. In order to complete the record of the duration of cloudiness these registers are supplemented by special personal observations of the state of the sky near the sun for an hour after sunrise and before sunset, and the cloudiness for these hours has been added as a correction to the instrumental records, whence there results a complete record of the duration of sunshine from sunrise to sunset.

The average cloudiness of the whole sky is determined by numerous personal observations at all stations during the daytime, and is given in the column "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table IX for the stations at which instrumental self-registers are maintained.

The percentage of clear sky (sunshine) for all of the stations included in Table I, obtained as described in the preceding paragraph, is graphically shown on Chart VII. The regions of cloudy and overcast skies are shown by heavy shading; an absence of shading indicates, of course, the prevalence of clear, sunshiny weather.

The formation of fog and cloud is primarily due to differences of temperature in a relatively thin layer of air next to the earth's surface. The relative position of land and water surfaces often greatly increases the tendency to form areas of cloud and fog. This principle is perhaps better exemplified in the Lake region than elsewhere, although it is of quite general application. The percentage of sunshine on the lee shores of the Lakes is always much less than on the windward shores. Next to the permanent influences that tend to form fog and cloud may be classed the frequency of the passage of cyclonic areas.

The current month.—The geographic distribution of sun-

shine and, conversely, of cloudiness, is shown on Chart VII.

The two features that seem to call for special mention are the low percentage of sunshine in the South Atlantic region, particularly in Georgia, and the great excess of sunshine that obtained in Oklahoma and Kansas. It will be remembered that in the remarks on temperature mention was made of an area of high monthly mean temperature central in Kansas. The area of increased insolation, as determined by the distribution of sunshine, is considerably greater in extent than that of high temperature above referred to, the latter being wholly within and a little to the northeast of the center of the area of greatest insolation. The rainfall in this region, as also the cloudiness, was below normal, a combination of circumstances quite detrimental to agricultural interests. On the South Atlantic coast easterly to southeasterly winds prevailed, with thunderstorms and much rain. There were also several disturbances in the Gulf and off the coast of Florida and Georgia which tended to produce cloud and rain.

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.8	+0.8	Missouri Valley	3.3	-0.8
Middle Atlantic	5.1	+0.1	Northern Slope	3.6	-0.1
South Atlantic	6.1	+0.9	Middle Slope	3.2	-1.1
Florida Peninsula	4.6	-0.6	Southern Slope	3.7	-1.6
East Gulf	6.3	+1.4	Southern Plateau	3.3	-0.1
West Gulf	4.6	+0.2	Middle Plateau	3.3	+1.1
Ohio Valley and Tennessee ..	4.5	0.0	Northern Plateau	2.7	-0.3
Lower Lake	5.7	+1.2	North Pacific Coast	4.8	+0.9
Upper Lake	5.1	+0.3	Middle Pacific Coast	3.8	+1.0
North Dakota	3.3	-0.6	South Pacific Coast	2.5	0.0
Upper Mississippi Valley ..	4.3	+0.2			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Buffalo, N. Y.	3	51	sw.	Havre, Mont.	3	54	nw.
Charleston, S. C.	30	52	e.	Do.	21	60	sw.
Chicago, Ill.	16	72	sw.	Pierre, S. Dak.	5	60	nw.
Do.	15	60	sw.	Savannah, Ga.	31	78	nw.

LOCAL STORMS.

2d-3d.—A Gulf hurricane having a comparatively narrow track struck the Florida coast at Apalachicola about midnight of the 2d. The velocity of the wind for a time was estimated at 80 miles per hour, and considerable damage was done to vessel property. The tug *Ocean Gem* was wrecked, becoming a total loss, three other tugs were sunk and a number of sailboats were damaged. The casualties of the storm in the Gulf were as follows: Tug *Keyser* foundered 15 miles off Cape San Blas with a loss of three lives; the dredge *Herndon* was cut adrift when the *Keyser* went down and afterward foundered with the loss of one life. The hurricane passed inland and broke up into general rains in western Florida and southeastern Alabama.

3d.—A severe local storm visited Sandusky, Ohio, at 3:35 p. m., partially wrecking a few buildings and damaging many

others. One building was completely wrecked, involving a loss of \$5,000; other losses, not including destruction of shade trees and crops, will aggregate at least as much.

A severe electrical storm occurred at Philadelphia, Pa., during the forenoon of the 3d. (See precipitation, page 347.)

14-15th.—A tornado moving in a southeasterly direction passed about 2½ miles west of Gary, S. Dak., at 6:30 p. m., central time. The path of great destruction was not continuous over the entire track of the storm (about 15 miles). Eight persons were killed (5 in one house) and 6 were injured. The loss to buildings was about \$7,000; crops, live stock and farm machinery, \$13,000.

Winds of almost hurricane force were reported in the vicinity of Minot, N. Dak., and severe local disturbances prevailed in Minnesota and Wisconsin. Gales on Lake Michigan the night of the 15th endangered several of the larger craft, partially dismantled the schooners *Ida Olsen* and *Butcher Boy*, and sunk two yachts in the harbor of Chicago where a squall wind of 72 miles per hour was registered.

16th.—A minor tornado passed through the country east of Fairbank, Fayette County, Iowa, about 5 p. m., destroying a few farm buildings and some live stock. No loss of human life.

17th.—Severe thunder and hail storms occurred in Massachusetts, Rhode Island and Connecticut. In the vicinity of Boston much damage was done by lightning and 2 persons were killed. Grain in the field, trees, chimneys, etc., were somewhat damaged by the wind squalls which preceded these storms.

19th.—A series of severe wind and thunderstorms swept over the northwestern portion of Iowa on the evening of the 19th. The storms were first noted in Jackson County, Minn., and extended southeastward into and through the first two tiers of counties in Iowa. Within this belt there were many local wind squalls of much severity, the wind being strong enough to overturn freight cars and demolish frail structures. Two fatalities occurred near Petersburg, a few miles north of Superior. A barn, in which a man and his wife were living, was blown to pieces, killing both occupants. There was no funnel cloud nor other evidence of whirling. The minimum value of property destroyed was about \$25,000.

24th.—A remarkably violent series of thunderstorms occurred in a region extending from western Pennsylvania to eastern Massachusetts on the afternoon of the 24th. The electrical discharges were extraordinarily frequent and brilliant. Thirty-eight persons were struck by lightning of whom 9 were killed; a large number of buildings were also struck.

25th.—Thunderstorm activity was renewed the next day (the 25th) in New York, Pennsylvania, and New England, in which region 22 persons were struck, 11 being killed.

31st.—A tropical storm struck the coast of Georgia in the neighborhood of Savannah, August 31, and while there was no loss of life the damage to property will aggregate close to half a million dollars. The storm began early on the night of the 30th and raged with increasing violence until about 8 a. m. of the 31st. Probably 100 buildings were wholly or partially unroofed and as many others damaged in other ways. The storm was not so severe in the sea islands as the great storm of 1893. The beaches north of Tybee, however, were lined with wrecks of small craft, and at Bluffton and the small settlements near by nearly all of the houses were unroofed and many were destroyed. The Norwegian bark *Ragna*, which went ashore on Gaskin Bank, is a total wreck. The bark *Noe* was wrecked and has about disappeared. This is the vessel in which Lieutenant Morgan and one of his companions lost their lives in attempting to rescue the crew. The loss to the rice crop on the Savannah River is estimated at \$200,000.

The steam pilot boat *J. H. Estill*, which arrived in Tybee Roads on the night of September 2, after a cruise of a day and a night, reported six wrecks of coastwise schooners off Martin's Industry Lightship, 15 miles from Tybee. Several of them were sunk, others bottom upward, and all of them apparently having been anchored when the storm struck them. The storm was not felt except within a comparatively short distance from the Savannah River, and nearly as much damage was done by water as by wind.

WATERSPOUTS ON THE GREAT LAKES.

The following description of a number of waterspouts observed on Lake Erie, August 13, 1898, is taken from the *Marine Record* of Cleveland, Ohio, August 25, 1898:

We cleared from Ashland with ore, and on Saturday morning were about 20 miles east of the Dummy. There was a 10-knot breeze, and the sun was shining as bright as could be. The captain was at the wheel and had her course laid due east, calculating to touch Ashtabula. About 8 o'clock I noticed a black cloud forming on the starboard quarter. It kept growing bigger and blacker, and rising higher and higher. It seemed to gain on the ship, and we began making preparations for a blow. In a little while the cloud was to our bow, racing along on a parallel course, but not going up into the sky far enough to obscure the sun. Then a peculiar thing happened. A portion of the cloud seemed to drop down toward the water. The section was forked like the tail of a fish, and it dropped lower and lower until it nearly reached the water. Then the lake directly under it began to boil. We could see the water whirling round and round, and then begin to rise to meet the descending cloud. Then they came together and the cloud seemed to rise up again, taking tons and tons of water along with it. We had none of us ever seen a waterspout before, but we knew this was the genuine article. The spout appeared to be about 10 feet in diameter and connected the great cloud and the lake like a big cable. It was black as the cloud and seemed to be surrounded by a heavy mist, which, after a little, when the strange freak got nearer, we found was descending water, falling like the spray from a fountain. All the time the sun was shining and the falling mist was turned into a rainbow that danced and flashed about the column of water in a way that I can't describe. It was the prettiest sight I've ever seen.

But it wasn't long before another part of the cloud began to descend and another section of the lake to boil and rise, and pretty soon there was another waterspout racing alongside of the *Forbes*, a bit closer than the first, and we began to think it inclined to be a trifle too familiar. Right along on our starboard side the two black fellows raced, and worse yet, another and another was formed, until seven of the big columns of black water were waltzing along and swaying along, some pretty close to the ship, others farther away toward the southward. Sometimes the columns of water would move along as stiff and straight as a squad of soldiers, and then they would begin to stagger and swing around like a lot of drunken fellows trying to do a cake-walk. All the time the water for 100 feet about the base of each pillar was churned into a white foam, and I tell you it was an awful sight. There would not have been a ghost of a show for any lake vessel once in among the racing columns of water, and we were moving along right at the edge in a parallel direction, not knowing at what minute the wind would veer and send them all in our direction.

Our greatest fear was that the big fellows, in their crazy gyrations, might collide and go to pieces. Were they to do so it meant a sudden fall of tons upon tons of water, and if the *Forbes* should be in the path of the descending flood, you can guess what the result would be. After a while the first waterspout began to disappear; just as it had formed, the cloud at that point settling lower and lower, then separating from the lower part of the column, and rising away again, while where it had been the water once more became comparatively quiet.

One by one they disappeared, and we were beginning to congratulate ourselves upon our good fortune, when I saw the captain turn the wheel sharp. What do you think? Why, there, dead ahead, and nearer than any of the others, was the king pin of all. It looked to be half a mile in diameter, but wasn't black like the others, having more the appearance of a big waterfall.

We just naturally concluded we could see our finish then. You know sailors are superstitious, and I guess some of them thought the Falls had taken a move up the lake since the last trip down, from what they said.

The wind seemed to slacken a bit, and that helped us, for the big waterspout did not move as rapidly as the others had, and it was soon well to starboard, and thus we gradually worked away from it. That, too, shortly afterward began to disappear as the smaller ones had done, and in an hour and a half from the time the cloud had first appeared, it and the cables it had picked up, as if to tow itself along, had all disappeared and the sky was as clear as before.

Capt. James Montgomery, master of the *Kittie M. Forbes*, was asked his impressions of the peculiar lake phenomenon. He corroborated

the main details of the mate's story, and declared that he had never seen anything to equal the spectacle presented by this strange freak.

I've heard a great many lake men tell of seeing waterspouts here, but I always gave them a grain of allowance. I supposed they were only found on the ocean, but I can back up their stories with my own experience now.

I must confess that I was a bit scared of the big fellow dead ahead of us, for I had heard that those strange formations burst sometimes, and I knew the *Kittie M.* would be sure to go down should that mass of water fall upon her. I think that prompt action in sheering to the northward prevented a collision, and probably the fact that the wind eased up aided our escape.

I counted seven of the waterspouts, and it was more than an hour and a half from the time we saw the first one until the last had disappeared. They were of varying size, from that of a man's body to that of a house. They seemed to extend from the surface of the lake into the clouds.

In a letter to First Mate Reynolds inquiry was made as to the location of the spouts and the date of their occurrence. His reply is, in part, as follows:

We were about 15 or 20 miles east-northeast of the Dummy or Point Pelee Light on Lake Erie when the black cloud began to move from a north-northeasterly to a southwesterly direction on the morning of August 13, 1898. On that date, between 7:30 a. m. and 9:00 a. m., we saw seven full-fledged waterspouts. The greatest of these appeared to be directly in our course, so we turned out and passed about half a mile from it. Although the others were some distance away they were plainly seen, as the day was clear.

The Weather Map of August 13 (7 a. m. central time) shows an area of low pressure, central over the mouth of the St. Lawrence. The weather at all stations on Lakes Erie and Huron was clear, with light winds, pressure between 30.10 and 30.20.

Two points in the description given by Mate Reynolds are of especial interest, viz, the direction in which the spouts progressed and the fact that the weather was clear. It is quite generally believed that tornadoes and waterspouts are closely allied phenomena. The direction of movement in a tornado is almost invariably from southwest to northeast or a direction almost exactly contrary to that taken by the waterspouts observed by Mate Reynolds. Tornadoes rarely, if ever, form under the conditions of temperature, pressure, and humidity that obtained over Lake Erie on the morning of August 13.

The impression that the vessel would be swamped in case the spout broke over her was a natural though erroneous one. Little water is carried up in waterspouts, contrary to a somewhat general belief. The danger to a vessel coming into actual contact with a waterspout would be from the whirling winds rather than the water.

ATMOSPHERIC ELECTRICITY.

Thunderstorms.—Four thousand eight hundred and fifty-three reports of thunderstorms were received during the current month as against 4,260 in 1897, and 5,376 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 17th, 319; 24th, 291; 23d, 277; 18th, 258; 16th, 255.

Reports were most numerous from New York, 310; Ohio, 296; Pennsylvania, 249; Colorado, 221.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, from 1st to 5th, and 26th to 31st.

The greatest number of reports were received for the following dates: 16th, 8, and 12th, 7.

Reports were most numerous from Wisconsin, 8; Montana, 6.

In Canada.—Auroras were reported as follows: St. Johns, 18; Father Point, 14, 17, 19, 22; Quebec, 16, 17, 18, 19, 26;

White River, 26; Minnedosa, 12, 13, 15, 16, 17; Qu'Appelle, 6; Swift Current, 15; Prince Albert, 24; Banff, 16.

Thunderstorms were reported as follows: St. Johns, 23, 31; Halifax, 23, 25; Grand Manan, 17, 22; Bermuda, 12, 14, 20, 22, 23, 26; Yarmouth, 25; Charlottetown, 9, 10; Father Point, 6, 16, 17; Quebec, 4, 9, 13, 16, 17, 22; Montreal, 12, 16, 29; Rockliffe, 3; Toronto, 3, 11, 12, 16, 21, 23, 24; White

River, 4, 5, 11, 20, 28, 31; Ottawa, 16, 29, 31; Port Stanley, 3, 7, 8, 11, 12, 16, 24; Saugeen, 15, 25; Parry Sound, 3, 11, 25, 28; Port Arthur, 28, 31; Winnipeg, 14, 15, 16, 24, 28; Minnedosa, 4, 18, 19, 22; Qu'Appelle, 14; Medicine Hat, 1, 3, 4, 5, 14, 21, 28; Swift Current, 3, 4, 11, 17, 22, 31; Kamloops, 3; Prince Albert, 8, 20; Battleford, 8; Esquimalt, 15; Banff, 2, 3, 8, 11, 19, 21.

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Rainfall is expressed in inches.

Alabama.—The mean temperature was 78.7°, or about normal; the highest was 102°, at Pineapple on the 24th, and the lowest, 59°, at Florence on the 24th. The average precipitation was 7.43, or 3.11 above normal; the greatest monthly amount, 17.48, occurred at Alco, and the least, 1.02, at Riverton.—*F. P. Chaffee.*

Arizona.—The mean temperature was 81.9°; the highest was 124°, at Fort Mohave on the 10th, and the lowest, 41°, at Fort Defiance on the 11th. The average precipitation was 3.01; the greatest monthly amount, 8.51, occurred at Calabasas, and the least, 0.19, at Yuma.—*W. G. Burns.*

Arkansas.—The mean temperature was 79.4°, or 0.6 above normal; the highest was 104°, at Lonoke on the 23d, and the lowest, 55°, at Fayetteville on the 4th. The average precipitation was 4.35, or 1.01 above normal; the greatest monthly amount, 8.42, occurred at Jonesboro, and the least, 1.86, at Conway.—*E. B. Richards.*

California.—The mean temperature was 74.5°, or normal; the highest was 124°, at Volcano Springs on the 14th, and the lowest, 23°, at Bodie on the 3d. The average precipitation was 0.02, or 0.03 below normal; the greatest monthly amount, 0.99, occurred at Edgewood, while no rain fell at more than half of the stations.—*W. H. Hammon.*

Colorado.—The mean temperature was 66.9°, or 2.3° above normal; the highest was 107°, at Delta on the 14th, and the lowest, 29°, at Wagon Wheel Gap on the 2d, and at Breckenridge on the 10th. The average precipitation was 1.48, or 0.27 below normal; the greatest monthly amount, 3.62, occurred at Yuma, and the least 0.14 at Crook.—*F. H. Brandenburg.*

Florida.—The mean temperature was 80.8°, or slightly below normal; the highest was 97°, occurring at several stations on different dates; the lowest was 58°, at St. Andrews Bay on the 7th. The average precipitation was 12.96, or about 6.50 above normal; the greatest monthly amount, 31.26, occurred at St. Andrews Bay, and the least, 5.34, at Sebastian.—*A. J. Mitchell.*

Georgia.—The mean temperature was 78.5°, or about normal; the highest was 99°, at Millen on the 25th, and the lowest, 59°, at Diamond on the 13th. The average precipitation was 10.09, or 4.66 above normal; the greatest monthly amount, 28.70, occurred at Fleming, and the least, 2.45, at Greenbush.—*J. B. Murbury.*

Idaho.—The mean temperature was 69.1°; the highest was 110°, at Payette on the 11th, and the lowest, 31°, at Swan Valley on the 23d. The average precipitation was 0.51; the greatest monthly amount, 1.44, occurred at Burnsile, and the least, trace, at Downey and Idaho City.—*D. P. McCallum.*

Illinois.—The mean temperature was 73.8°, or 0.3 above normal; the highest was 100°, at Martinsville on the 22d, and at New Burnside on the 24th, and the lowest, 45°, at Lanark and Scales Mound on the 12th, and at Kishwaukee on the 13th. The average precipitation was 4.41 or 1.69 above normal, and was very unevenly distributed, over 10.00 falling at Laharpe and Knoxville, while less than 2.00 fell at several stations.—*C. E. Linney.*

Indiana.—The mean temperature was 74.2°, or 0.8° above normal; the highest was 99°, at Boonville on the 23d, and at Vincennes and Washington on the 24th, and the lowest, 46°, at Winamac on the 5th. The average precipitation was 3.36, or 0.35 above normal; the greatest monthly amount, 6.85, occurred at Jasper, and the least, 0.94, at Greensburg.—*C. F. R. Wappenhans.*

Iowa.—The mean temperature was 71.2°, or nearly normal; the highest was 103°, at Clarinda and Council Bluffs on the 20th, and the lowest, 40°, at Britt on the 1st. The average precipitation was 3.44, being very unequally distributed; the greatest monthly amount, 10.55, occurred at Bonaparte, and the least, 0.58, at Adair.—*G. M. Chappel.*

Kansas.—The mean temperature was 78.2°, or 1.9° above normal;

the highest was 108°, at Eureka Ranch on the 20th, at Minneapolis on the 29th, and at Meade on the 31st; the lowest was 46° at Frankfort on the 1st. The average precipitation was 2.46, or 0.63 below normal; the greatest monthly amount, 6.30, occurred at Osage City, while none fell at Hoxie.—*T. B. Jennings.*

Kentucky.—The mean temperature was 76.7°, or 1.3° above normal; the highest was 100°, at Paducah and Russellville on the 23d, and the lowest, 55°, at Princeton on the 12th, at Loretto on the 19th, and at Maysville and Owenton on the 28th. The average precipitation was 3.82, or 0.64 above normal; the greatest monthly amount, 9.86, occurred at Alpha, and the least, 1.10, at Woodburn.—*G. E. Hunt.*

Louisiana.—The mean temperature was 81.0°, or 0.3° above normal; the highest was 102°, at Liberty Hill on the 18th and 23d, and the lowest, 58°, at Minden on the 31st. The average precipitation was 6.26, or 1.30 above normal; the greatest monthly amount, 14.39, occurred at Venice, and the least, 1.39, at Como.—*A. G. McAdie.*

Maryland and Delaware.—The mean temperature was 75.9°, or 2.0° above normal; the highest was 98°, at Boettcherville, and Laurel, Md., on the 31st, and the lowest, 46°, at Deerpark, Md., on the 28th. The average precipitation was 6.27, or 3.79 above normal; the greatest monthly amount, 10.61, occurred at Receiving Reservoir, D. C., and the least, 2.81, at Annapolis, Md.—*F. J. Walz.*

Michigan.—The mean temperature was 67.4°, or 1.5° above normal; the highest was 101°, at Owosso on the 23d, and the lowest, 28°, at Newberry on the 19th. The average precipitation was 2.88, or 0.36 below normal; the greatest monthly amount, 5.92, occurred at Gladwin, and the least, 0.75, at Mount Clemens.—*C. F. Schneider.*

Minnesota.—The mean temperature was 66.9°, or about normal; the highest was 102°, at Wabasha on the 31st, and the lowest, 33°, at Roseau on the 17th. The average precipitation was 3.22, or about 0.75 above normal; the greatest monthly amount, 6.17, occurred at Montevideo, and the least, 0.86, at Morris.—*T. S. Outram.*

Mississippi.—The mean temperature was 80.4°, or 0.4° above normal; the highest was 105°, at Columbus on the 23d, 24th, and 29th, and the lowest, 59°, at French Camp on the 14th. The average precipitation was 5.97, or 2.01 above normal; the greatest monthly amount, 16.95, occurred at Mossport, and the least, 1.83, at Greenwood.—*R. J. Hyatt.*

Missouri.—The mean temperature was 75.6°, or about 1.0° above normal; the highest was 103°, at Jefferson City on the 23d, and the lowest, 44°, at Potosi on the 5th. The average precipitation was 3.01, or about normal; the greatest monthly amount, 7.20, occurred at Oto, and the least, 0.40, at Bolckow.—*A. E. Hackett.*

Montana.—The mean temperature was 68.0°, or 1.6° above normal; the highest was 105°, at Glendive on the 21st, and the lowest, 31°, at Adel on the 23d. The average precipitation was 0.66, or about normal; the greatest monthly amount, 1.38, occurred at Columbia Falls, and the least, 0.09, at Poplar.—*E. J. Glass.*

Nebraska.—The mean temperature was 74.2°, or about normal; the highest was 109°, at Camp Clarke on the 21st, and the lowest, 42°, at Lodgepole on the 9th. The average precipitation was 2.24, or about 0.33 below normal; the greatest monthly amount, 6.85, occurred at Calaway, while none fell at Lodgepole.—*G. A. Loveland.*

Nevada.—The mean temperature was 73.6°, or about 1.0° above normal; the highest was 112°, at St. Thomas on the 11th, and the lowest, 29°, at Blaine on the 31st. The average precipitation was 0.45, or 0.04 above normal; the greatest monthly amount, 2.85, occurred at Ely, while none fell at a number of stations.—*R. F. Young.*

New England.—The mean temperature was 69.6°, or 2.7° above normal; the highest was 95°, at Plymouth, N. H., on the 4th, and the lowest, 33°, at Flagstaff, Me., on the 12th. The average precipitation was 5.67, or 1.62 above normal; the greatest monthly amount, 11.89, occurred at Jefferson, Mass., and the least, 0.70, at North Conway, N. H.—*J. W. Smith.*

New Jersey.—The mean temperature was 74.8°, or 2.7° above normal; the highest was 98°, at Imlaytown on the 31st, and the lowest, 42°, at Charlotteburg on the 28th. The average precipitation was 5.36, or 1.52 above normal; the greatest monthly amount, 9.28, occurred at Camden, and the least, 2.70, at Barnegat Lighthouse.—*E. W. McGann.*

New Mexico.—The mean temperature was 71.0°, or 2.6° below normal; the highest was 99° at Gila on the 14th, and the lowest, 34°, at Winsors on the 26th. The average precipitation was 2.27, or 0.28 below